

## INTERRELATIONS IN A NESTING GROUP OF FOUR SPECIES OF BIRDS

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THIS article concerns the interrelations among pairs of Western Flycatcher (*Empidonax difficilis*), Creeper (*Certhia familiaris*), Bewick's Wren (*Thryomanes bewicki*), and Oregon Junco (*Junco oreganus*) which nested in close proximity to each other in the village of Carmel, Monterey County, California, during the seasons of 1940 and 1941. Not more than one pair of each species was nesting in the area at one time.

As nest sites all the birds used man-made structures. These buildings, located on five contiguous city lots, consist of two one-car garages and an open shed attached to one of them, a small frame house, and a

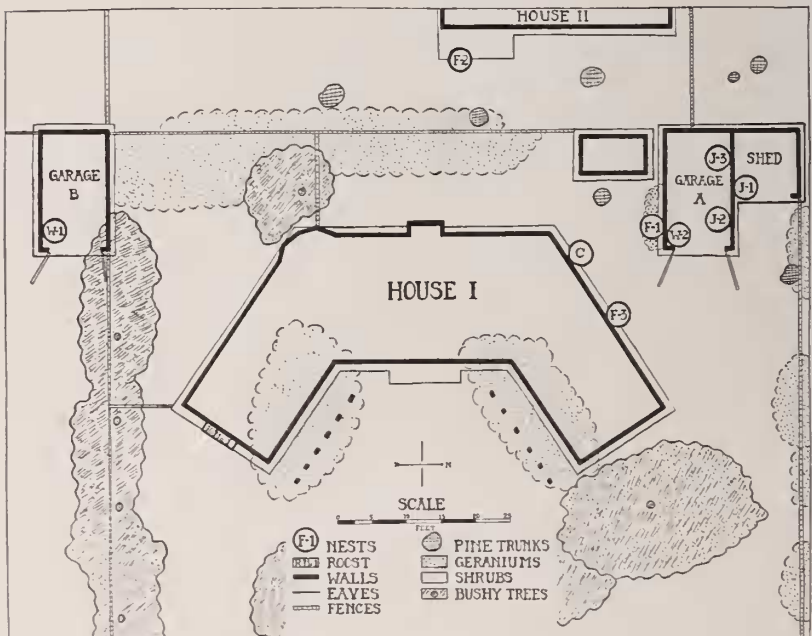


Figure 1. Plan of nest sites.

larger wooden house with walls covered by vertical slabs of redwood bark (Figures 1 and 2). A few Monterey pines, a live oak, a toyon, and a manzanita or two are almost the only relics of the original cover. Most of the native flora has been replaced by exotic trees and shrubs, the

dominant species being genista and acacias. Somewhat less altered conditions prevail on vacant lots nearby. The locality is within the Transition Zone of the humid Pacific Coast District.

#### WESTERN FLYCATCHER

*Season of 1940.*—To make a nesting site for this species a four-inch board was nailed to the rafter ends, about seven feet above the ground, under the south eave of Garage A (Figures 1 and 2). Within a few weeks a pair of flycatchers built a nest (F-1) against a rafter at one end of the board (Figure 3); the young took flight from it on June 2.



Figure 2. Garage A. Nest F-1 was beneath the eave on the left; F-3 was around the corner of House I, on the extreme left. Bewick's Wren and Junco nested on opposite sides of the garage interior. The Creeper nest was on the same face of the house as F-3.

Eleven days later, on June 13, the same nest was being renovated by a flycatcher, presumably one of the same pair. Shredded redwood bark, stripped from the side of House I, was used to build up the sides of the nest, which had been slightly flattened by the first brood. On June 16 an egg was laid, and incubation of a set of three began on June 19. The young hatched on July 4, the fifteenth day of incubation. Five days later they were removed from the nest, presumably by a predator. Bent (1942: 249) remarks that the Western Flycatcher's "period of incubation is said to be 12 days."

*Season of 1941.*—On May 28 a Western Flycatcher nest (F-3) was found about nine feet above the ground on a horizontal slab of bark over a window of House I (Figure 1). This was probably the second seasonal nest of a pair which had recently fledged young from a nest (F-2) on the porch of House II, about 50 feet away. F-3 was 17½ feet from F-1. The three eggs laid in F-3 were removed on June 3, shortly after incubation had begun, probably by a California Jay (*Aphelocoma californica*).

On July 4 it was observed that nest F-1, which had remained more or less intact on the board beneath the protecting eave since its second use in the preceding season, was again being renovated by a flycatcher.



Figure 3. Western Flycatchers at nest (F-1) built on the end of a board beneath the eave of Garage A. May 29, 1940.

The sides of the nest were rebuilt, and it was used for a second brood as it had been in 1940. The possible renovation of nests of this species for a second brood is indicated by F. M. Bailey (1906), and by Grinnell and Linsdale (1936: 84). Repair and re-use of nests by this species in succeeding years is recorded by Gale (as quoted by Bent).

#### CREEPER

*Season of 1940.*—On March 23 both members of a pair of Creepers were seen bringing pine needles into a crevice between slabs of redwood

bark on the northwest face of House I. This nest, designated as C, was  $15\frac{1}{2}$  feet from the flycatcher nest, F-1 (Figures 1 and 4). A slight widening of the crevice, used as an entrance, was  $8\frac{1}{4}$  feet above the ground. Both parents brought food to the young, which left the nest on May 24.

#### BEWICK'S WREN

*Season of 1941.*—On March 11 a pair of wrens was observed building a nest (W-1) inside Garage B, 80 feet south of Garage A (Figure 2). The nest was placed on the roof plate about eight feet above the ground. The young left this nest on May 3.



Figure 4. Adult Creeper leaving nest crevice (nest C) on the side of House I. May 18, 1940.

Another nest (W-2) containing six eggs, presumably the second set of the same pair, was found on the plate in Garage A on June 6. Five of the six eggs hatched by June 11, but only two of the young were finally fledged. They left the nest on June 28. I do not know what became of the sixth egg nor the other three young. It was noted that spiders were sometimes included in the diet offered by one, or both, of the parents (Figure 5).

## OREGON JUNCO

*Season of 1940.*—On June 1 a nest (J-1) of this species was being built on a shelf in the open lean-to shed at the north side of Garage A (Figure 1). On June 5 the first of a set of three eggs was laid. On June 19, after two eggs had hatched, the nest was found destroyed, probably by a cat.

*Season of 1941.*—On June 10 a female junco was seen carrying nesting material into Garage A, where the wrens had nest W-2 which then held six eggs. Large masses of dry grass were brought in on June 11. On June 16 a nest (J-2), containing two eggs to which a third was later added, was found 10½ feet away from Nest W-2 on the roof plate on



Figure 5. Bewick's Wren on the door of Garage A, carrying a spider to feed its young in the nest within the garage. June 15, 1941.

the opposite side of the garage. (A nest of the Carolina Junco [*Junco hyemalis carolinensis*] was found by Sprunt [1930] "placed on the rafter of a garage.") Two young hatched on June 29; they were missing on July 4, probably removed by a jay.

Another nest, J-3, was being constructed on July 8, supposedly by the same pair of juncos. It was on the same plate as J-2 but 7¾ feet farther back in the garage. The first of a set of three eggs was found in it on July 12. The last young hatched between 7 P.M. on July 25 and 5:45 P.M. on July 26. On August 6, at 12:10 P.M., as I was inspecting this nest, I flushed one of two young from it (the third young bird had disappeared some days previously in an unknown manner). The second

bird left the nest, apparently of its own accord, about 15 minutes later. Thus the two young were fledged in not more than 13 days.

FLYCATCHER: CREEPER

On May 24, 1940, when the young flycatchers in F-1 were one week old, the fledgling creepers left nest C. As they took their initial flights they passed close by and lit near F-1; they were attacked in swooping flights by a parent flycatcher, so that one young creeper fell into a thick tangled clump of geraniums beneath the flycatcher nest.

FLYCATCHER: JUNCO

On May 30, 1940, antagonism was noted between one of this same flycatcher pair and a junco, probably one of the pair that built J-1. The birds were seen to fight and then fall together into the geraniums. On June 2 the flycatcher swooped and "chattered" at the female junco as she flew from the still empty J-1.

FLYCATCHER: WREN

On the evening of June 22, 1941, when the young wrens were still in W-2, the male wren was found roosting in the flycatcher nest, F-3, which had been deserted some time previously\*. On the night of June 23 the male again roosted in F-3, and the female was found sleeping on the edge of her own nest, not down in the cup—apparently the young entirely filled the cup of W-2. On June 25 the male wren returned to an old roost (Roost No. 1) between redwood slabs on the side of House I (Williams, 1941: 277). The female, however, roosted in another flycatcher nest, F-1, which was just outside the garage wall from her own nest. This nest had remained *in situ* since its last use by the flycatchers in 1940. The female wren continued to roost there on succeeding nights. On the night of June 30, two days after her young had left the nest, she came to F-1 at the usual roosting time with her mate and two young. One of the young clambered onto the nest with her, but presently left, and the female roosted there alone. The male and one of the young roosted in separate chinks at Roost No. 1.

The female's roosting in F-1 continued undisturbed until July 4 when a Western Flycatcher began working fresh material into the sides of the nest. On that evening, as the wren worked her way to the eave directly above the nest, the flycatcher darted at her from a nearby perch, snapping its bill. The wren retaliated by posturing: tail cocked and spread, wings dropped, head held low. Twice again the flycatcher flew at the wren. At one of these encounters the wren fell or flew down out of sight in the geraniums under the nest. About ten minutes later

\* In the sleeping posture in the nest the lower back and rump feathers were ruffed out, revealing their subterminal white spots. This ruffing out may be said to be typical of roosting Bewick's Wrens (Williams, 1941). However, in this case, the bird was lying horizontally with tail pointing diagonally upward, whereas the roosting wrens referred to in my 1941 paper generally perched upright with the tail drooping.

the whole wren family, both adults and two young, appeared near F-1. The female wren went to the nest. Twice the flycatcher hovered and snapped its bill in front of the wren on the nest, but the wren remained. The flycatcher flew at one of the young wrens, apparently pecking it, to judge from the ensuing squeal. The flycatcher also drove off the male wren as he approached F-3, 17½ feet from F-1. None the less the female wren was later found roosting in F-1 and persisted in roosting there each night until July 10. The flycatcher laid the first of a set of three eggs in F-1 on July 8. That evening the wren looked down into the nest twice as she settled down to roost. The next night she roosted on two flycatcher eggs, lying well down in the cup of the nest, as the male had at F-3. From outward appearances the wren might have been incubating the flycatcher eggs!

But on the evening of July 10 the flycatcher itself had already started incubation and was on the nest when the wren arrived for roosting. As the wren flew from the eave toward the nest the flycatcher darted off, snapping its bill, and seemed to make contact with the wren, since they both fluttered down into the geraniums together. After the flycatcher had extricated itself it remained nearby and, when the wren crept out of the thicket, attacked again. But almost immediately the wren approached the nest once more, lighting on the side of the garage near it, whereupon the flycatcher attacked, forcing the wren off and, with much loud snapping of bills, they fluttered down into the geraniums again. A squeal was heard, apparently uttered by the wren. Soon the wren moved off, and the flycatcher returned to incubation. I never saw the wren roosting there again.

All three flycatcher eggs hatched, the last between 1 P.M. and 7 P.M. on July 25, making the incubation 15 days, counting from the laying of the last egg until all were hatched. Because the duration of this period corresponds with that of the second brood of 1940, it may be supposed that the sleeping of the female wren on first one, then two, eggs on successive nights in the laying period had no effect on their hatching time. No data was obtained as to whether the wren exposed her abdominal skin to the eggs, nor what the temperature of the eggs was as she slept on them. All three young were fledged and left the nest on August 10 before 11:52 A.M., thus taking their first flight in the sixteenth 24-hour period after the last of them had hatched. Bent (op. cit.) presents no data on the fledging period for this species.

#### JUNCO: WREN

The most persistent and aggressively hostile behavior among the birds of this neighborhood of assorted species was exhibited by the pair of juncos that built J-2 and J-3 inside Garage A across from W-2. On June 13, 1941, when five of the wren's eggs had hatched, but before the juncos had begun to lay, the juncos were seen flying at the wrens as

they attempted to bring food to their young. A junco succeeded by these actions in driving a wren away once during an hour of observation in the early afternoon and twice during two hours in the late afternoon. On succeeding days, until the young wrens left the nest, both adult wrens were chased by both juncos. But the wrens managed to bring food to their young in spite of this. After the female junco started incubation, the male did most of the driving, although the female drove upon occasion when she was off the eggs. On June 19, for instance, during an observation period from 11:58 A.M. to 12:41 P.M., the female junco drove a wren upon three occasions while the male drove a wren eight times. The female wren was quicker to return to the garage entrance and more direct in following her route to the young than her mate, who was easily put off by the movements of the juncos and more hesitant in going to the nest. The male wren, holding a load of food in his bill, was actually restrained from delivery for 39 minutes on one occasion, at the end of which period I was forced to leave, the food being still undelivered.

The exact extent of the juncos' territory was never ascertained but I saw them chase the wrens as far as 29 feet northeast and 36 feet east from the garage entrance. The wrens nearly always fled to shrubs and bushy trees. Driving seemed confined to the vicinity of the garage entrance, the only route to the nest used by either pair.

The juncos habitually swooped upon the wrens whenever the latter lit on the ridgepole, the eaves, or the open or closed garage doors (even when closed these doors left a crack at the top large enough for the birds to go through). No actual contact between the birds was ever seen; the wrens always flew away. However, while one wren was being driven from the garage entrance the mate would sometimes dart in from another direction with food for the young.

Retaliation against the juncos was noted only once. On June 28, 1941, the two surviving young wrens of W-2 took flight. When the second one left the nest it fluttered to the ground just outside the garage entrance. The female junco left the nest where she was incubating, flew down to the fledgling wren, and pecked at it. Contact was probably made, as wren feathers, some still partly in sheaths, were found later at the spot. The young wren immediately flew off. At the same moment the male parent wren flew to the ground and advanced close to the female junco. The wren approached the junco slowly, tail spread, wings quivering over the back, while he made a series of snapping sounds, suggestive of the bill-snapping of a flycatcher capturing an insect. The display lasted only a second or two and then both birds flew away.

Often while watching the activities of the two pairs, I noticed that the male junco, while his mate was incubating at the other side of the garage, came up and looked at the nestling wrens. On June 23, six



days before his own young hatched, he put his bill into the open mouth of a young wren. On June 24 and again on June 26 he had a food-like object in his bill before going to the wren nest; but on these occasions, because of the poor light, it was impossible to determine whether the young wrens were actually fed by the junco. On five occasions on June 27, however, I definitely observed the male junco putting food into the mouth of a nestling wren. Feedings by the junco were interspersed with those administered by the parent wrens. On June 28 the male junco was seen removing excreta from the wren nest.

#### DISCUSSION

Belligerency of the Western Flycatcher toward other species in the vicinity of its nest has been recorded by Richardson (1908: 67), who observed a pair during the process of nest construction. While one bird worked on the nest the other "would place itself in an exposed position to ward off intruders. Evidently it classed all birds as intruders, for an innocent Dusky Warbler, which happened to alight in the tree, was instantly driven off, leaving behind a goodly number of feathers."

The role of "helpers" at the nest, in which another or even several other birds attach themselves to a pair and join in feeding the female and young, has been described briefly by several writers and at some length by Skutch (1935). None of the cases mentioned by the latter, however, involved birds of different species, and the exact status of the helpers was not known beyond the fact that they were most frequently immature birds. There are, however, at least five records in the literature of nesting birds feeding the young of another species in a nearby nest. Hales (1896) tells of a male Scarlet Tanager feeding Chipping Sparrows in their nest before his own young had hatched. Forbush (1929: 420) reports a male Bluebird which, "instead of attending to his own young in a nesting box some thirty feet from the wren-box," attacked the parent wrens and then started feeding the young wrens. A. A. Allen (1930: 224-226) describes the actions of a pair of Redstarts, whose young were being photographed on the hands of Dr. Allen's children. The male readily came and fed his young, but the female was restrained by fear and delivered her food instead to nestling Robins in a nest 25 feet away. Twombly (1934) published a note concerning a Song Sparrow pair with eggs of its own, which fed nestling American Robins, and were first attacked by the Robin parents and then tolerated; the male Song Sparrow continued to feed the young Robins after they had left the nest. Lonsdale (1935) writes of Blue Tits which built a nest inside a nesting box on top of which a pair of English Robins (*Erithacus r. melophilus*) had already built a nest. The Robins laid five eggs and the tits three. When the former eggs hatched, the tits covered their own eggs with feathers and fed the young Robins. At first there was a "bit of a fight but eventually the birds settled

down" and no further friction was noted. After the young Robins left the nest the tits laid another set of seven eggs over the original three and raised a brood.

All five of these cases refer to pairs nesting in close proximity. Three of them refer, as does my own record, to feeding done before the feeder's own young had hatched; the others (the Bluebird and Redstart) had young of their own. In two of these instances the male alone did the foster-feeding, while in the case of the Redstart it was the female. Two of the records describe antagonism exhibited by the true parents toward the foster parents (American and British Robins). The Bluebird, like my Oregon Junco, fed the young wrens even though it attacked the wren parents. Thaxter (1930) describes a "Sacramento spurred towhee" feeding young Sierra Juncos out of the nest and attacking and driving away a female towhee which "would appear on the scene and become interested in the family." But the exact status of the towhees was not given.

E. V. Miller (1941: 92) says that Bewick Wrens do not use posturing as an aid in the maintenance of territory, nor does he record any other instance of posturing by the species. Mrs. Nice (1941), however, records display posturing of *Thryomanes bewickii cryptus* (a male courting a female; a male guarding a nest box) during which wings and tail were spread. In the present study I saw both sexes display, each using a slightly different form.

Nine English Wrens (*Troglodytes t. troglodytes*) have been found roosting together in an old Song Thrush nest (Dunsheath and Doncaster, 1941) and a Mountain Chickadee (*Penthestes gambeli*) has been found roosting in a Robin nest (Bassett, 1923). No antagonism, nor the re-use of these nests by the original owners, was mentioned by these authors.

In the present study, encounters were recorded between the flycatcher and creeper, flycatcher and junco, flycatcher and wren, and junco and wren. In each case the first named was the aggressor. In spite of this interference, all these species had some degree of nesting success.

Further study of interspecific pugnacity might point the way toward a better understanding of much antagonistic behavior among birds. Certainly it would seem that such behavior could not have its origin in sexual rivalry, which has so often been pointed out as a *raison d'être* for territorial behavior. On the one hand, no instance of antagonism was noted by Tinbergen (1939: 13, 28) between Snow Buntings and three other species which live in Snow Bunting territories, except on rare occasions when females apparently mistook Lapland Longspurs for female Snow Buntings. On the other, Mrs. Nice (1937: 68) says that Song Sparrows drive sixteen other species from their territories. "Field Sparrows (*Spizella pusilla*) are driven off with special vigor;

nevertheless, two pairs used regularly to nest on Interpont in the midst of the Song Sparrows." Lack (1936) records pugnacity between pairs of two species of starlings in Tanganyika Territory. Had the aggressor been successful, he writes, no material gain would have been achieved since there was no competition for nesting holes, each of the two pairs nesting in its own cavity four feet from the other in the same dead limb. The *Onychognathus walleri* "were so aggressive that a pair of *Stilbopsar kenricki* were not able to bring material to their own hole." They were aggressive "as a result of the close proximity, not competition, of the *kenricki*. The *kenricki* persisted in building, and eventually toleration was established. The *kenricki* were never observed to retaliate against the *walleri*." The Bewick Wrens, also, were never seen to retaliate against their aggressors except in the two instances of display noted above, and although there was no ceasing of hostilities, the wrens completed their nesting cycle.

#### SUMMARY

A small community of nesting pairs of four species, Western Flycatcher (*Empidonax difficilis*), Creeper (*Certhia familiaris*), Bewick's Wren (*Thryomanes bewickii*), and Oregon Junco (*Junco oreganus*), is described. All used man-made structures for nest sites.

The walls of a Western Flycatcher's nest were rebuilt for a second brood in the first season, and again rebuilt and used for one brood the following year.

There was antagonism between the nesting pairs, especially between the flycatcher and wren, and junco and wren.

Along with this, however, the male junco fed nestling wrens. Similar behavior in other species is discussed.

Antagonistic display by both male and female wren is recorded, and the circumstances detailed.

Both male and female wren roosted in flycatcher nests.

Other records of interspecific antagonism are discussed, and it is suggested that further study of such behavior might lead to greater understanding of the original causes of territorial behavior.

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BOX 453, CARMEL, CALIFORNIA

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WILDLIFE PORTFOLIO OF THE WESTERN PARKS. By Joseph S. Dixon. U. S. Department of Interior. 1942: 8 x 10 in., 121 pp., 58 photos. \$1.25 of Supt. of Documents, Washington, D. C.

This attractive book of wildlife photographs was published "as a standard for camera enthusiasts and for the enjoyment of others who simply like to look." The majority of the photographs are by Dixon, but some notable pictures have been contributed by Wendell Chapman, Frank R. Oastler, the Muries, and others. The first 38 photographs are of mammals, 18 others are of birds, and two are of reptiles. The pictures are curiously uneven in quality—a number are first-class, others very mediocre. The author's 35 years' field experience from Alaska to Mexico has in most cases enabled him to handle successfully the difficult task of providing an interesting and worthwhile text for each picture. Scientific names are lacking even in the introductory "List of Animals."—J. Van Tyne.